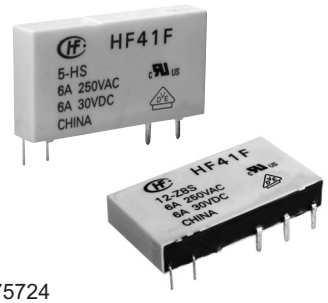
# HF41F SUBMINIATURE POWER RELAY

File No.: E133481

File No.: 40020043

File No.: CQC17002175724




## Features

- Slim size (width 5mm)
- 6A switching capability 4kV dielectric strength (between coil and contacts)
- Surge voltage up to 6kV (between coil and contacts)
- Meeting VDE 0700, 0631 reinforce insulation
- High sensitive: Approx.170mW
- Sockets available
- 1 Form A and 1 Form C configurations

## CONTACT DATA

| | |
|---|---|
| Contact arrangement | 1A, 1C |
| Contact resistance 1) | 100mΩ max. (at 1A 6VDC)<br>Gold plated: 30mΩ max.(at 1A 6VDC) |
| Contact material | $AgSnO_2$, AgNi |
| Contact rating (Res. load) | 6A 250VAC / 30VDC |
| Max. switching voltage | 400VAC / 125VDC |
| Max. switching current | 6A |
| Max. switching power | 1500VA / 180W |
| Mechanical endurance | 1 x $10^7$OPS |
| Electrical endurance | H type: 6 x $10^4$OPS (6A 250VAC/30VDC, Resistive load, AgNi, at 85°C, 1s on 9s off)<br>Z type: 3 x $10^4$OPS (NO, 6A 250VAC/30VDC, Resistive load, AgNi, at 85°C, 1s on 9s off)<br>1 x $10^4$OPS (NC, 6A 250VAC/30VDC, Resistive load, AgNi, at 85°C, 1s on 9s off) |

**Notes:** 1) The data shown above are initial values.

## CHARACTERISTICS

| | | |
|---|---|---|
| Insulation resistance | | 1000MΩ (at 500VDC) |
| Dielectric strength | Between coil & contacts | 4000VAC 1 min |
| | Between open contacts | 1000VAC 1 min |
| Operate time (at nomi.volt.) | | 8ms max. |
| Release time (at nomi.volt.) | | 4ms max. |
| Shock resistance*1) | Functional | 49m/s² |
| | Destructive | 980m/s² |
| Vibration resistance*1) | | 10Hz to 55Hz 1mm DA |
| Humidity | | 5% to 85% RH |
| Ambient temperature | | -40°C to 85°C |
| Termination | | PCB |
| Unit weight | | Approx. 5g |
| Construction | | Plastic sealed, Flux proofed |

**Notes:** 1) Index is that of relay without socket and is not in relay length direction.
2) The data shown above are initial values.
3) Please find coil temperature curve in the characteristic curves below.
4) Please do not install a SPDT(1 Form C) type relay on either of the smallest sides or facing downward.
5) UL insulation system: Class A.

## COIL

| | |
|---|---|
| Coil power | 5VDC to 24VDC: Approx. 170mW<br>48VDC, 60VDC: Approx. 210mW |

## COIL DATA at 23°C

| Nominal Voltage VDC | Pick-up Voltage VDC max.1) | Drop-out Voltage VDC min.1) | Max. Voltage VDC3) | Coil Resistance Ω |
|---|---|---|---|---|
| 5 | 3.75 | 0.25 | 7.5 | 147 x (1±10%) |
| 6 | 4.50 | 0.30 | 9.0 | 212 x (1±10%) |
| 9 | 6.75 | 0.45 | 13.5 | 476 x (1±10%) |
| 12 | 9.00 | 0.60 | 18 | 848 x (1±10%) |
| 18 | 13.5 | 0.90 | 27 | 1906 x (1±15%) |
| 24 | 18.0 | 1.20 | 36 | 3390 x (1±15%) |
| 48 4) | 36.0 | 2.40 | 72 | 10600 x (1±15%) |
| 60 4) | 45.0 | 3.00 | 90 | 16600 x (1±15%) |

**Notes:** 1) The data shown above are initial values.
2) When require pick-up voltage≤70% nominal voltage, special order allowed .
3) Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.
4) For products with rated voltage ≥ 48V, measures should be taken to prevent coil overvoltage in order to protect coil in test and application (eg. Connect diodes in parallel).

## SAFETY APPROVAL RATINGS

| | |
|---|---|
| **UL/CUL** | 6A 30VDC at 85°C<br>6A 277VAC at 85°C<br>R300<br>B300 |
| **VDE** | 6A 30VDC at 85°C<br>6A 250VAC at 85°C |

**Notes:** 1) All values unspecified are at room temperature.
2) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

| | HF41F / | 12 | -H | 8 | S | T | G | (XXX) |
|---|---|---|---|---|---|---|---|---|
| **Type** | | | | | | | | |
| **Coil voltage** | 5, 6, 9, 12, 18, 24, 48, 60VDC | | | | | | | |
| **Contact arrangement** | **H:** 1 Form A | **Z:** 1 Form C | | | | | | |
| **Version** [1] | **8:** Flat pack version | **Nil:** Vertical version | | | | | | |
| **Construction** [2)3)] | **S:** Plastic sealed | **Nil:** Flux proofed | | | | | | |
| **Contact material** | **T:** $AgSnO_2$ | **Nil:** AgNi | | | | | | |
| **Contact plating** [4)] | **G:** Gold plated | **Nil:** No gold plated | | | | | | |
| **Special code** [5)] | **XXX:** Customer special requirement | **Nil:** Standard | | | | | | |

**Notes:** 1) We recommend flux proofed types for the flat pack version.
2) We recommend flux proofed types for a clean environment (free from contaminations like $H_2S$, $SO_2$, $NO_2$, dust, etc.).
We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like $H_2S$, $SO_2$, $NO_2$, dust, etc.).
3) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
4) For gold plated type, the min. switching current and min. switching voltage is 10mA 5VDC.
5) The customer special requirement express as special code after evaluating by Hongfa. e.g. (210) stands for pick-up voltage less than 70% of norminal voltage. e.g. (414) stands for wide coil pin type.
6) Standard tube packing length is 550mm. Any special requirement needed, please contact us for more details.
7) For products that should meet the explosion-proof requirements of "IEC 60079 series",please note [Ex] after the specification while placing orders.Not all products have explosion-proof certification,so please contact us if necessary, in order to select the suitable products.

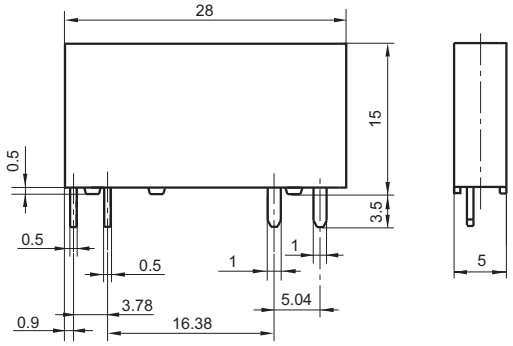
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

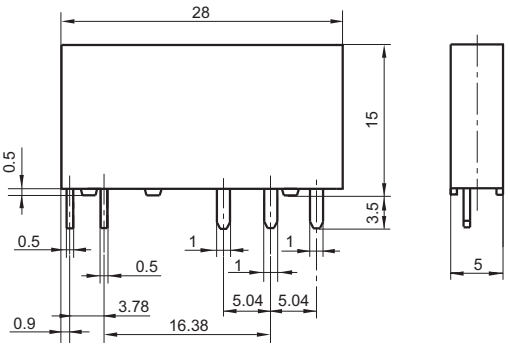
Outline Dimensions

1 Form A

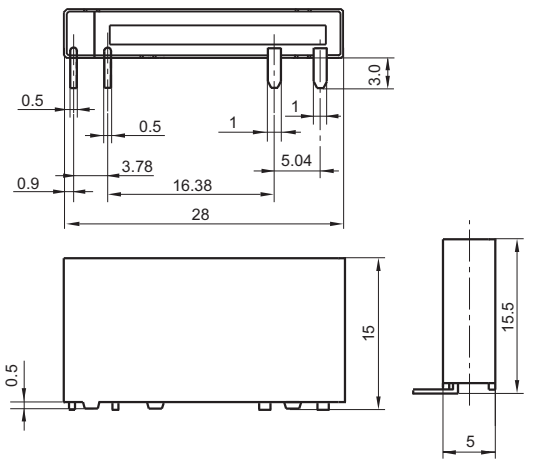
Vertical version

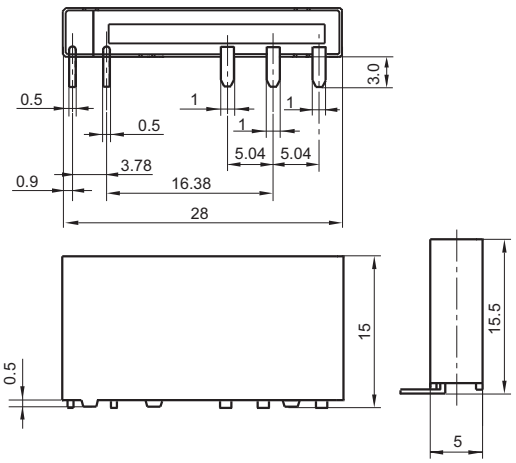



1 Form C




Flat pack version



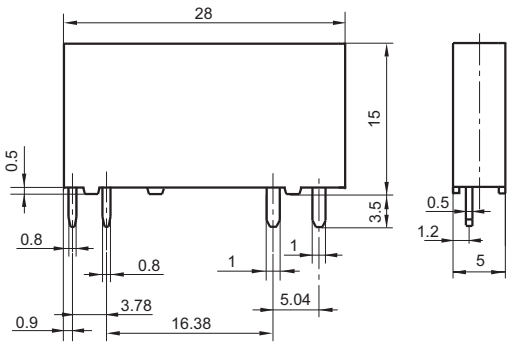
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

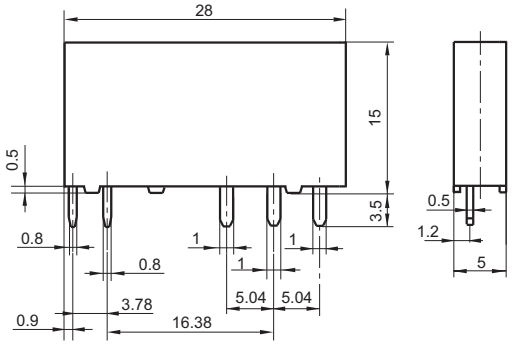
### Outline Dimensions

1 Form A

Special code: (414)



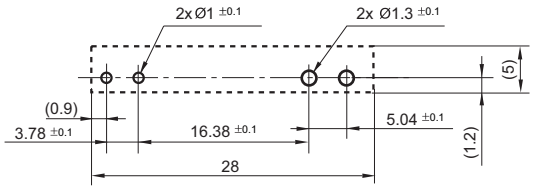

1 Form C



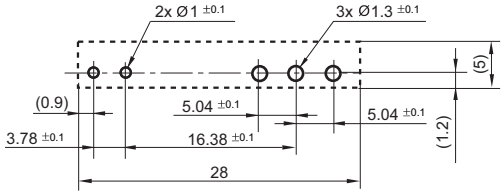

### PCB Layout (Bottom view)

1 Form A

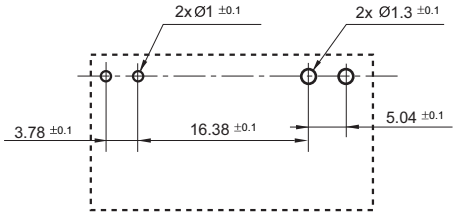
Vertical version

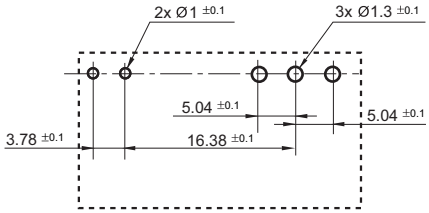



1 Form C

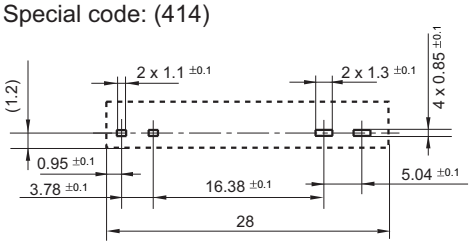


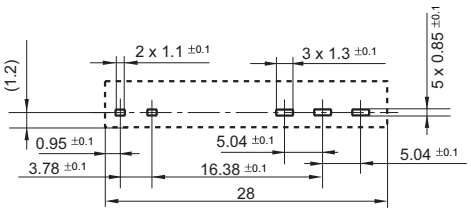

Flat pack version




Special code: (414)




### Wiring Diagram (Bottom view)

1 Form A

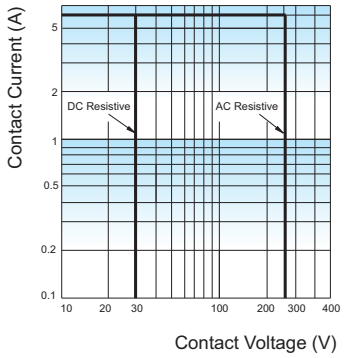
1 Form C

Remark: 1) In case of no tolerance shown in outline dimension: outline dimension ≤1mm, tolerance should be ±0.2mm; outline dimension >1mm and ≤5mm, tolerance should be ±0.3mm; outline dimension >5mm, tolerance should be ±0.4mm.

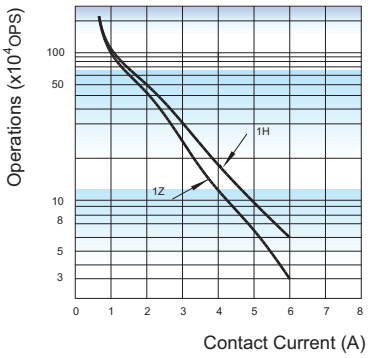
2) The tolerance without indicating for PCB layouts is always ±0.1mm.

## CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER

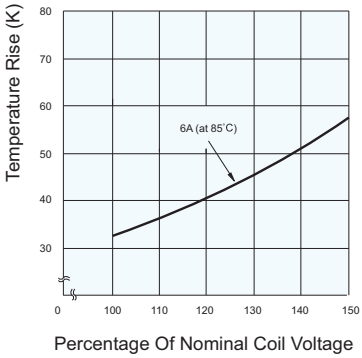



ENDURANCE CURVE



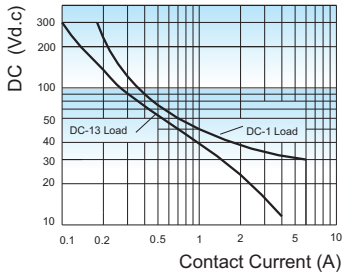

**Test conditions:**
NO, AgNi, Resistive load, 250VAC,
Flux proofed, Room temp., 1s on 9s off.

COIL TEMPERATURE RISE



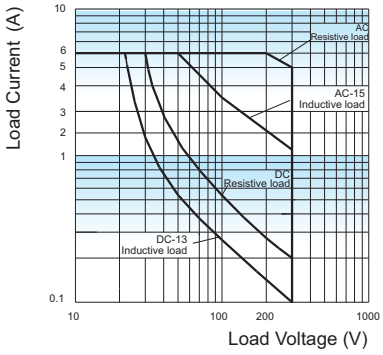

**Test conditions:**
6A 85℃
(Typical curve of 24VDC standard type)

LOAD SWITCHING CAPACITY CURVE



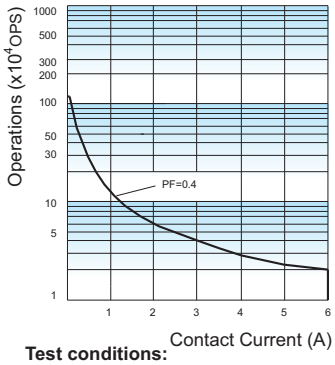

**Test conditions:** NO, Room temp.

BREAKING CAPACITY TRIP CURVE



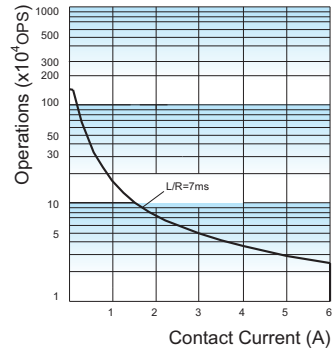

**Test conditions:**
Room temp., Plastic sealed, 1s on 9s off.

AC INDUCTIVE LOAD ENDURANCE CURVE




**Test conditions:**
NO，AgNi, Plastic sealed,Room temp.,
250VAC

DC INDUCTIVE LOAD ENDURANCE CURVE




**Test conditions:**
NO, AgNi,Plastic sealed, Room temp.,
24VDC

**Notes:** Characteristic data is not guaranteed value but measured values of samples from production line.

# Relay Sockets

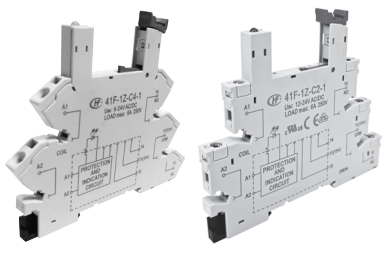
CE

c UL us

File No.: E253370

VDE

File No.: 40020043



## Features

- The dielectric strength can reach 4000VAC and the insulation resistance is 1000MΩ
- With finger protection device
- Ensure secure rention and easy ejection of relays
- Built-in protection circuit can indicate the power status, protect the circuit and expand the range of relay input voltage
- Components available: marker, jumper and separator
- Environmental friendly product (RoHS compliant)

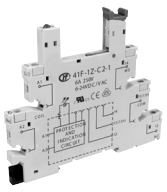
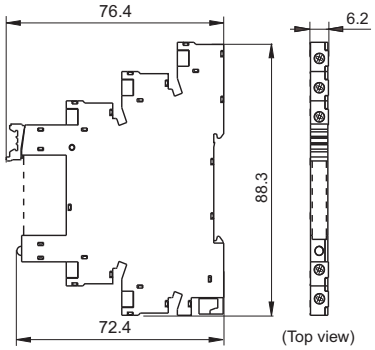
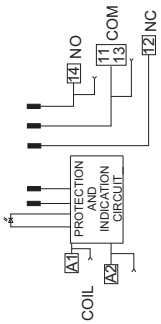
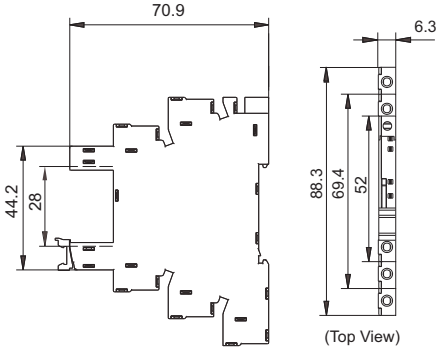
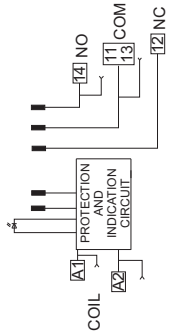
## CHARACTERISTICS

| Type | Nominal Voltage | Nominal Current | Ambient Temperature | Input Voltage | Relay's Applicable Rated Voltage | Polarity of Input Voltage | Wire Strip Length | Screw Torque | Unit weight |
|---|---|---|---|---|---|---|---|---|---|
| 41F-1Z-C2-1 | 250VAC | 6A | -40 ˚C to 70˚C | (12 to 24)VAC/DC | (12 to 24)VDC | No requirement | 7mm | 0.5N · m | Approx.27g |
| 41F-1Z-C2-2 | 250VAC | 6A | -40 ˚C to 70˚C | (48 to 60)VAC/DC | (48 to 60)VDC | No requirement | 7mm | 0.5N · m | Approx.25g |
| 41F-1Z-C2-3 | 250VAC | 6A | -40 ˚C to 55˚C | (110 to 125)VAC/DC | 60V DC | No requirement | 7mm | 0.5N · m | Approx.27g |
| 41F-1Z-C2-4 | 250VAC | 6A | -40 ˚C to 55˚C | (220 to 240)VAC/DC | 60V DC | No requirement | 7mm | 0.5N · m | Approx.27g |
| 41F-1Z-C2-5 | 250VAC | 6A | -40 ˚C to 70˚C | (6 to 24)VDC | (6 to 24)VDC | Requirement | 7mm | 0.5N · m | Approx.24g |
| 41F-1Z-C2-5(012) | 250VAC | 6A | -40 ˚C to 70˚C | (6 to 24)VDC | (6 to 24)VDC | No requirement | 7mm | 0.5N · m | Approx.24g |
| 41F-1Z-C4-1 | 250VAC | 6A | -40 ˚C to 70˚C | (12 to 24)VAC/DC | (12 to 24)VDC | No requirement | 7mm | --- | Approx.25g |
| 41F-1Z-C4-2 | 250VAC | 6A | -40 ˚C to 70˚C | (48 to 60)VAC/DC | (48 to 60)VDC | No requirement | 7mm | --- | Approx.24g |
| 41F-1Z-C4-3 | 250VAC | 6A | -40 ˚C to 55˚C | (110 to 125)VAC/DC | 60VDC | No requirement | 7mm | --- | Approx.25g |
| 41F-1Z-C4-4 | 250VAC | 6A | -40 ˚C to 55˚C | (220 to 240)VAC/DC | 60VDC | No requirement | 7mm | --- | Approx.25g |
| 41F-1Z-C4-5 | 250VAC | 6A | -40 ˚C to 70˚C | (6 to 24)VDC | (6 to 24)VDC | Requirement | 7mm | --- | Approx.23g |
| 41F-1Z-C10-1 | 250VAC | 6A | -40 ˚C to 70˚C | (12 to 24)VAC/DC | (12 to 24)VDC | No requirement | 10mm | --- | Approx.22.5g |
| 41F-1Z-C10-2 | 250VAC | 6A | -40 ˚C to 70˚C | (48 to 60)VAC/DC | (48 to 60)VDC | No requirement | 10mm | --- | Approx.22.5g |
| 41F-1Z-C10-3 | 250VAC | 6A | -40 ˚C to 55˚C | (110 to 125)VAC/DC | 60VDC | No requirement | 10mm | --- | Approx.23.1g |
| 41F-1Z-C10-4 | 250VAC | 6A | -40 ˚C to 55˚C | (220 to 240)VAC/DC | 60VDC | No requirement | 10mm | --- | Approx.23.1g |
| 41F-1Z-C10-5 | 250VAC | 6A | -40 ˚C to 70˚C | (6 to 24)VDC | (6 to 24)VDC | Requirement | 10mm | --- | Approx.22.4g |
| 41F-1Z-A1 | 250VAC | 6A | -40 ˚C to 70˚C | (6 to 60)VDC | (6 to 60)VDC | Requirement | --- | --- | Approx.2.9g |
| 41F-1Z-A2-1 | 250VAC | 6A | -40 ˚C to 70˚C | (6 to 24)V DC | (6 to 24)V DC | Requirement | --- | --- | Approx.4g |
| 41F-1Z-A2-2 | 250VAC | 6A | -40 ˚C to 70˚C | (48 to 60)V DC | (48 to 60)V DC | Requirement | --- | --- | Approx.4g |

**Note:** When the 41F-1Z-C2/C4-1 socket is applied to the relay of 12VDC nominal voltage,the relay of which pick-up voltage =70% nominal voltage should be required and the special order of relay allowed. 41F-1Z-C2/C4-4 is not allowed in continuous electricity conditions.

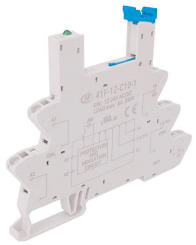
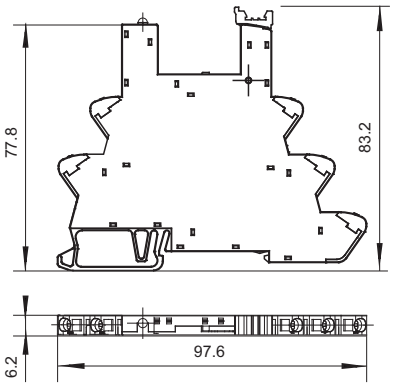
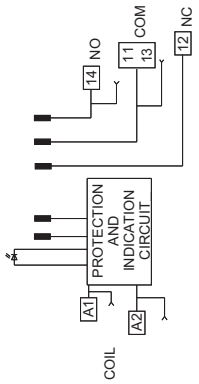
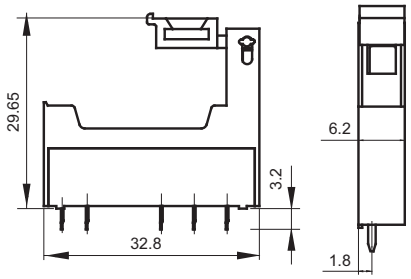
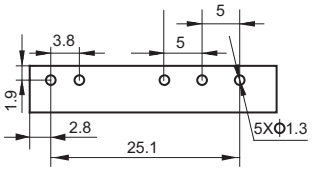
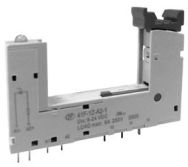
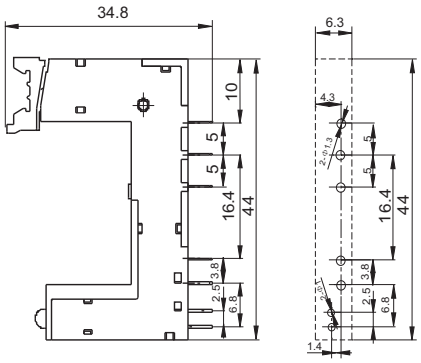
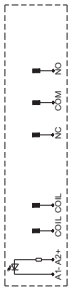
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

| Socket | Outline Dimensions | Wiring Diagram | Components Available |
|---|---|---|---|
| 41F-1Z-C2-1/2/3/4/5<br>  <br>Screw terminal,<br>DIN rail mounting,<br>With finger protection device<br>Certified by VDE and UL/CUL |  |  | marker 41F-M<br>41F-M1<br>jumper 41F-J1(blue)<br>41F-J1R(red)<br>41F-J1B(black)<br>separator 41F-S |
| 41F-1Z-C4-1/2/3/4/5<br>  <br>Spring-loaded terminal,<br>DIN rail mounting,<br>With finger protection device |  |  | marker 41F-M<br>41F-M1<br>jumper 41F-J1(blue)<br>41F-J1R(red)<br>41F-J1B(black)<br>separator 41F-S |

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

| Socket | Outline Dimensions | Wiring Diagram | Components Available |
|---|---|---|---|
| 41F-1Z-C10-1/2/3/4/5  |   |   | marker 41F-M<br>41F-M1<br>jumper 41F-J1(blue)<br>41F-J1R(red)<br>41F-J1B(black)<br>separator 41F-S |
| 41F-1Z-A1  |   |   | No requirement |
| 41F-1Z-A2-1/2  PCB terminal, PCB mounting |   |  | *marker 41F-M |

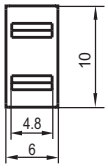
**Notes:** * If need accesscry,please order with type.

## DIMENSION OF RELATED COMPONENT (AVAILABLE)

Unit: mm

Marker

41F-M

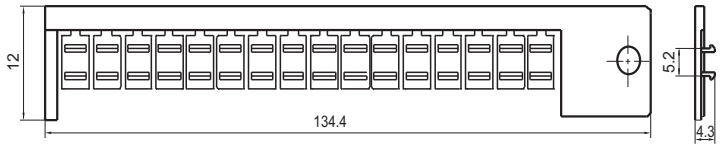


## DIMENSION OF RELATED COMPONENT (AVAILABLE)

Unit: mm

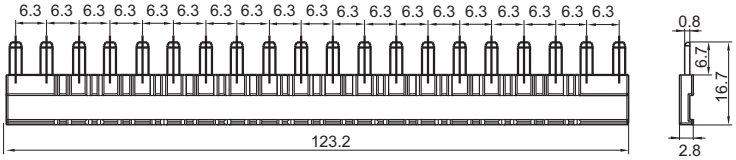
### Marker

41F-M1



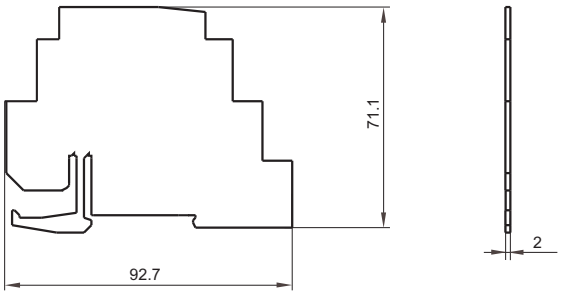

### Jumper

41F-J1(blue)、41F-J1R(red)、41F-J1B(black)




### Separator

41F-S




**Things to be noticed when selecting sockets:**

1. Please choose suitable relay socket according to the actual mounting environment, relay contact poles and terminal layout. If there is any query on selection, please contact Hongfa for the technical service.
2. As for related components, they should be selected separately. Please do give clear indication of the types of relay sockets and related components you choose while placing order.
3. The above is only an example of typical socket and related component type which is suitable to HF41F relay. If you have any special requirements, please contact us.
4. Main outline dimension, outline dimension＞50mm ,tolerance should be ±1mm; 20mm＜outline dimension ≤50mm, tolerance should be ±0.5mm; 5mm＜outline dimension ≤20mm, tolerance should be ±0.4mm; outline dimension≤5mm, tolerance should be ±0.3mm.
5. DIN rail mounting: recommend to use standard rail 35×7.5×1mm, 35×15×1mm.

## Precautions For Use

41F-1Z-C2-1/2/3/4/5

41F-1Z-C4-1/2/3/4/5

1. Please use the quick-break fuse with rating of 15Amp. for short-circuit protection.
2. It may cause failure, fire or malfunction, when the sockets is continuously applied the power to for a long term In case of exceeding the upper limit ambient temperature. So please ensure that the ambient temperature is within the upper limit when using sockets.

Operating temperature upper limit：55℃：41F-1Z-C2-3/4
41F-1Z-C4-3/4

Operating temperature upper limit：70℃：41F-1Z-C2-1/2/5
41F-1Z-C4-1/2/5

3. Things to be noticed when selecting soft wiring.

1) 41F-1Z-C2-1/2/3/4/5

The soft wiring can be divided into the following types.

· Twisted line or single wire below 2.5mm² or below AGW14.

· Within 2 roots when the twisted below 1.5mm² or below AGW16.

Be sure to use this size that the front end of the wire needs to be stripped of the 7mm~8mm insulation protection layer. (Figure 1)

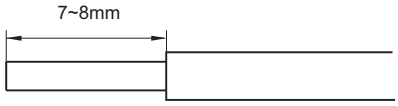



Figure 1

·Use the recommended screwdriver specifications when wiring.

Plus driver: Shaft Diameter - 3.5mm.

Single driver: Figure 2.

· Recommended tightening torque: 0.5N·m

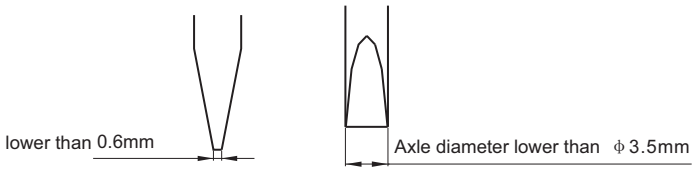



Figure 2.

b) 41F-1Z-C4-1/2/3/4/5

The soft wiring can be divided into the following types.

Twisted line or single wire greater than 0.5mm²or less than 2.5mm² or greater than AWG 20 and less than AWG14.

Be sure to use this size that the front end of the wire needs to be stripped of the 7mm~8mm insulation protection layer.

Use the recommended screwdriver specifications when wiring.

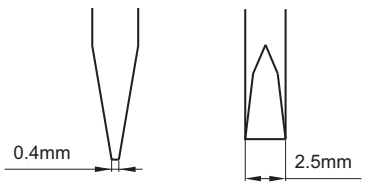



Figure 3.

## Precautions For Use

The insertion position of the wire and the screwdriver and the insertion direction of the screwdriver are as shown in Figure 4.

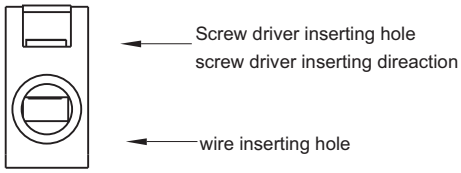



Figure 4

Please use cold pressed terminals when selecting twisted line.

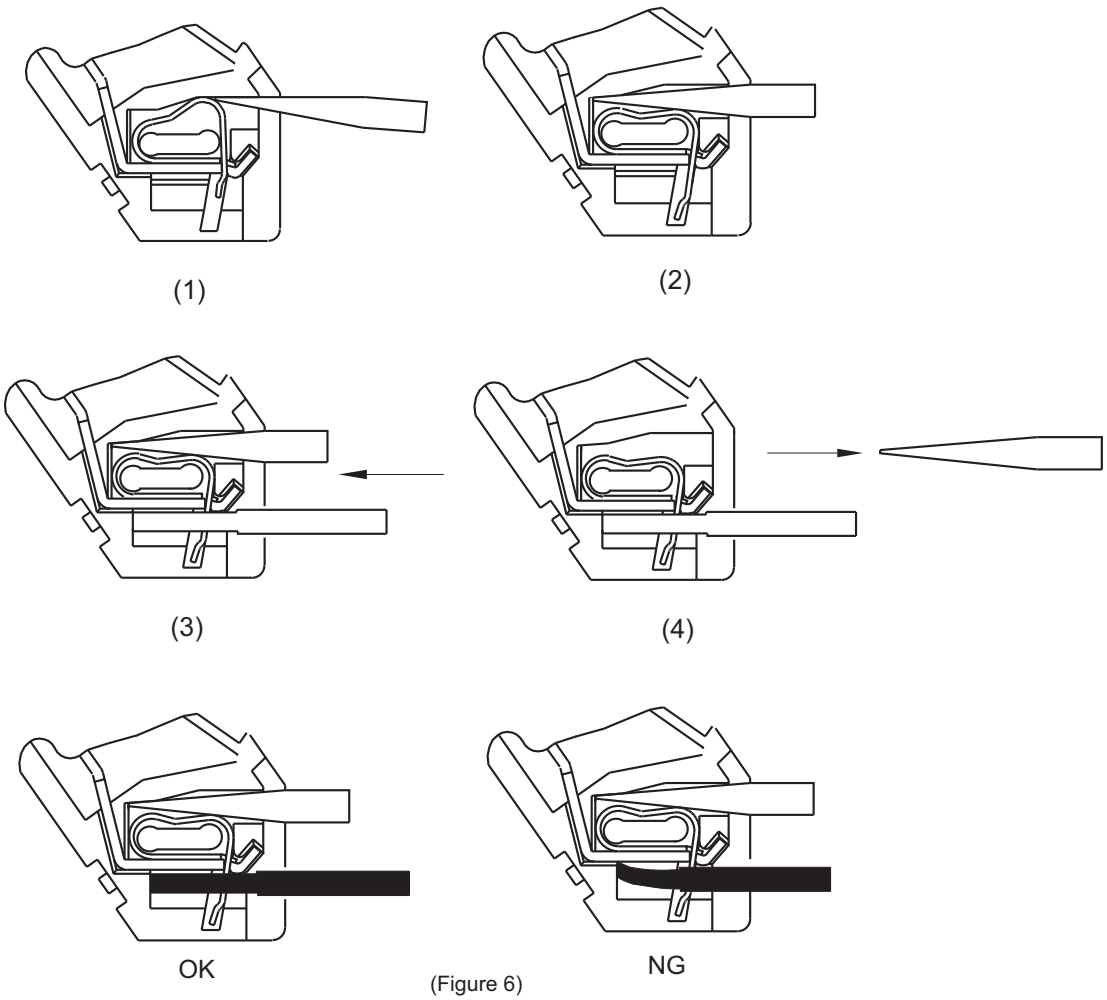
The method of Wiring as shown in figure 5.

Step 1. Insert screwdriver into socket with screwdriver patchhole.

Step 2. Push the screwdriver in until it touches the stop position inside the socket, and keep the screwdriver in this position.

Step 3. Please keep the screwdriver in this position, and wires inserted into the terminal insertion hole bottom.

Step 4. Pull out the screwdriver and the wiring is completed.




(Figure 6)

Do not insert the wire insulation.

## Precautions For Use

41F-1Z-C10-1/2/3/4/5

1. Please use the quick-break fuse with rating of 15Amp. for short-circuit protection.
2. It may cause failure, fire or malfunction, when the sockets is continuously applied the power to for a long term In case of exceeding the upper limit ambient temperature. So please ensure that the ambient temperature is within the upper limit when using sockets.
   Operating temperature upper limit* 55oC* 41F-1Z-C10-3/4
   Operating temperature upper limit* 70oC* 41F-1Z-C10-1/2/5
3. Things to be noticed when selecting soft wiring.
   The soft wiring can be divided into the following types.
   Be sure to use this size that the front end of the wire needs to be stripped of the 8mm~10mm insulation protection layer.

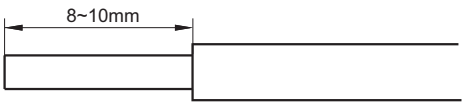



Figure 1

* If the stripping protective layer is too short, it may cause the wire to be pulled out. If it is too long, it may have a short circuit with the adjacent wire. If the stranded wire of cold pressed terminal is used, please tighten the wire of stranded wire before use to avoid loose wire.
  Use the recommended screwdriver specifications when wiring.*

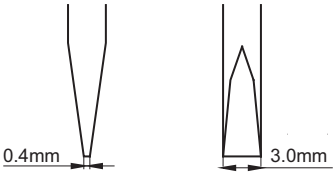



Figure 2

* The insertion position of the wire and the screwdriver and the insertion direction of the screwdriver are as shown inFigure 3.

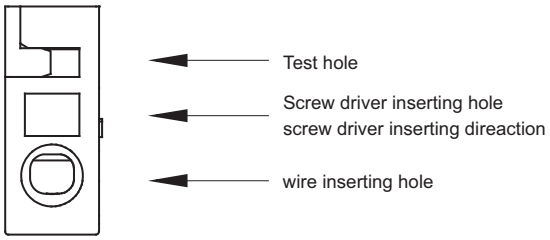
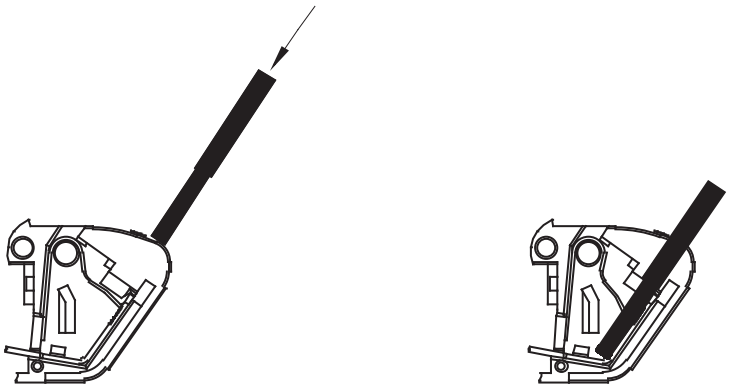



Figure 3

## Precautions For Use

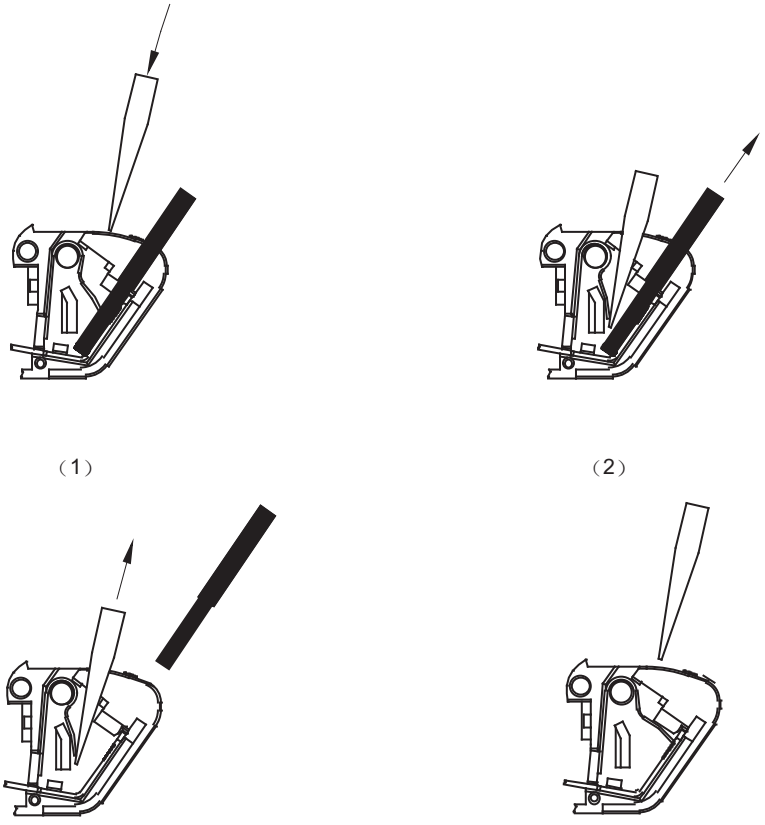
- Please use cold pressed terminals when selecting twisted line.
- The method of Wiring as shown in figure 4.
  Insert the wire into the wire insertion hole (circular hole) in the direction of (1) arrow, and insert the wire straight into the bottom, as shown in (2).



（1） （2）

Figure 4

- The method of Wiring as stitching in figure 5.
  Insert the wire into the wire insertion hole (circular hole) in the direction of (1) arrow, and insert the wire straight into the bottom, as shown in (2).



（1） （2）

（3） （4）

Figure 5

## Precautions For Use

4. Mounting relay.

Presents the socket anti-stripping spring in an open state (see Figure 7), and aligns the relay to the main socket cavity (Figure 8). Then turn the buckle counterclockwise and press the relay gently until it is fully plugged into the socket (Figure 9).

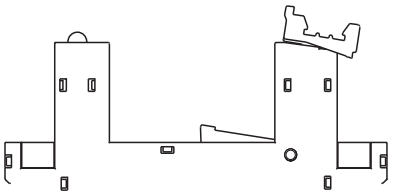


Figure 7

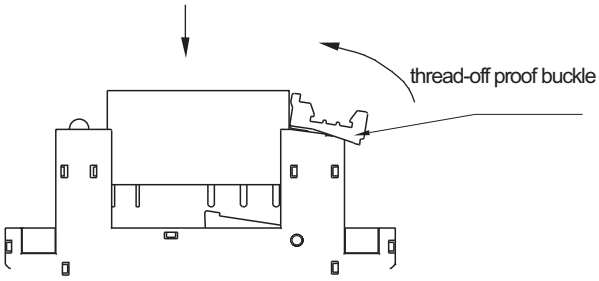



Figure 8

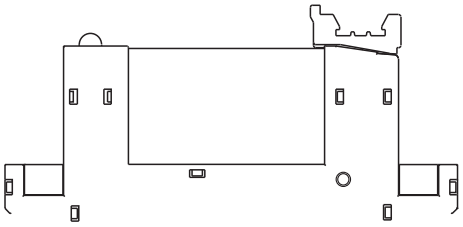
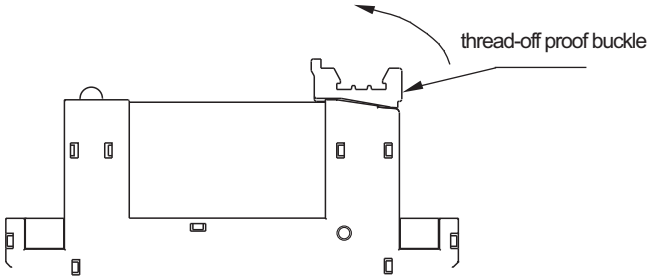
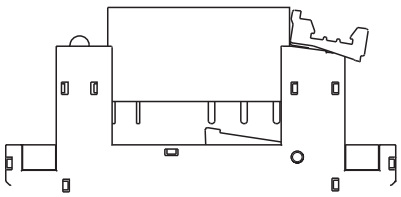


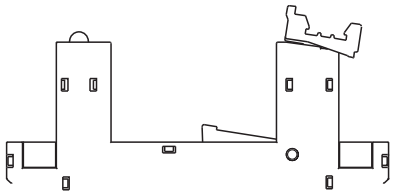
Figure 9

5. Disassembly relay.

Disconnect the relay by pulling the anti lock buckle of the socket clockwise (please refer to the pictures attached for more details)





## Precautions For Use

6. Installation socket.
   Insert the A of the socket into the rail and press it in the direction of the arrow.(Figure 11)

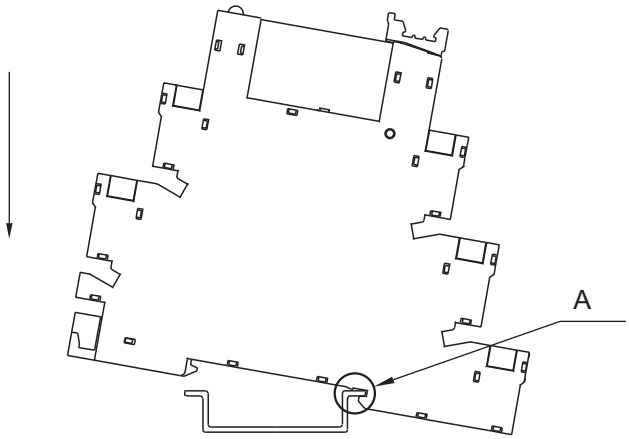



Figure 11

7. Disassembly socket.
   Insert a screwdriver into B, turn in the direction of the arrow, lift the socket and remove the socket.(Figure 12)

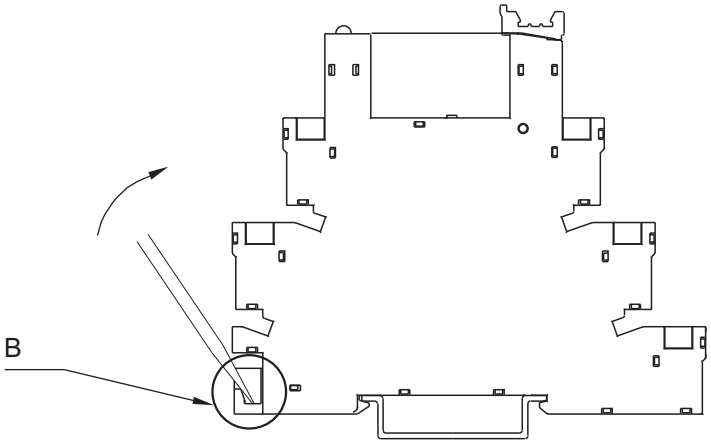



Figure 11